

### REMARKS

Claims 1-16, 19-23, 25-29, and 45-49 are pending and are rejected.  
Reconsideration and allowance of Claims 1-16, 19-23, 25-29, 45-46, and 49 are respectfully requested.

#### Finality of Rejection

It is respectfully submitted that the finality of the rejections in the Office Action dated July 22, 2008 is improper and therefore should be withdrawn. The finality of the rejection is improper because Applicant's previous amendment of April 21, 2008 did NOT necessitate the new ground of rejection. All claim limitations added to Claim 1 in Applicant's previous amendment were taken from original Claims 17-18, and therefore should have been searched for in previous office actions. Similarly, all claim limitations added to Claim 23 in Applicant's previous amendment were taken from original Claim 24, and all claim limitations added to Claim 45 in Applicant's previous amendment were taken from original Claims 47-48, and therefore should have been searched for in previous office actions. Thus, the "new" ground of rejection under 35 USC 103 is not necessitated by Applicant's amendment.

#### Claim Rejections under 35 USC §103

Claims 1-4, 6, 20-21, 23 and 27-29 are rejected under 35 USC §103(a) as being unpatentable over "A Versatile Data String-Search VLSI," written by Masaki Hirata and published by IEEE in April 1988, (hereinafter referred to as Hirata) in view of U.S. Patent No. 7,225,188 to Gai et al (Gai) and further in view of U.S. Patent 6,785,677 to Fritchman (Fritchman).

Claims 7-16, 19, and 25-26 are rejected under 35 USC §103(a) as being unpatentable over Hirata in view of Gai and Fritchman, and further in view of U.S. Patent 7,134,143 to Stellenberg et al (Stellenberg).

Claims 45-46 and 49 are rejected under 35 USC §103(a) as being unpatentable over Hirata in view of Gai, Fritchman, and further in view of U.S. Patent 5,712,971 to

Stanfill et al (Stanfill) and "Fast Routing Table Look-up Using CAMs" written by McAuley.

The patentability of each independent claim is discussed separately below.

#### Independent Claim 1

Applicant's Claim 1 recites, in part:

searching the database for a first pattern matching the prefix characters;  
searching the database for a second pattern matching the suffix characters; and  
creating a count that equals a number of the suffix characters plus a number of  
the wildcard characters.

The Office Action states that Hirata discloses "searching the database for a first pattern matching the prefix characters," "searching the database for a second pattern matching the suffix characters," and "creating a count that equals a number of the suffix characters plus a number of the wildcard characters," and refers to Hirata at pgs. 330-331.

Applicant disagrees.

The portion of Hirata cited by the Office Action states that for wildcard comparisons:

suppose that "\$" is stored as a wildcard and "ABC," "AVC," and "BBC" are stored as reference words in the CAM. If an input data string "A\$C" is entered, match signals are generated from the CAM for both the stored data "ABC" and "AVC."

Thus, Hirata teaches searching for the reference words "ABC," "AVC," and "BBC" for a match with the input data string "A\$C" **in parallel** using a CAM device. Therefore, Hirata does NOT disclose "searching the database for a first pattern matching the prefix characters," "searching the database for a second pattern matching the suffix characters," and "creating a count that equals a number of the suffix characters plus a number of the wildcard characters," as recited in Applicant's Claim 1.

Indeed, the Office Action subsequently acknowledges that Hirata does not disclose a count value, and then concludes that one of ordinary skill in the art would clearly recognize that the teachings of Hirata, Gai, and Fritchman “are equivalent to the claimed feature of counting that equals a number of the suffix characters and a number of the wildcard characters to find a matching string.”

Applicant points out that “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”<sup>1</sup> In this case, the Office Action concludes that the teachings of Hirata, Gai, and Fritchman “are equivalent” to Applicant’s count without articulating a reasoning with some rationale underpinning, for example, that explains how a count would be used in such a proposed combination of Hirata, Gai, and Fritchman or why a count would be beneficial to the proposed combination of Hirata, Gai, and Fritchman.

Thus, because the proposed combination of references does not meet all the limitations recited in Applicant’s Claim 1, Claim 1 is not obvious over the cited references.

Claims 2-16, 19, and 22 depend from Claim 1 and therefore distinguish over the cited references for at least the same reasons as Claim 1.

#### Independent Claim 20

Applicant’s Claim 20 recites:

A method, comprising:

receiving a text string having a plurality of characters; and

performing an unanchored search of a database of a stored patterns matching one or more characters of the text string using a state machine, wherein the state machine comprises a ternary content addressable memory (TCAM) and wherein the performing comprises comparing a state of the state machine and one of the plurality of characters with contents of a state field and a character field, respectively, stored in the TCAM, wherein the contents of the state field and the character field stored in the

TCAM embody state transitions of the state machine, wherein the performing further comprises:

converging all branches of the state machine, for a given stored pattern, to a single next state when a first number of the characters are matched to the contents of a state field to all state transitions of the branches.

The Office Action simply concludes that Hirata discloses “converging all branches of the state machine, for a given stored pattern, to a single next state when a first number of the characters are matched to the contents of a state field to all state transitions of the branches,” and refers to Hirata at pg. 331, col. 1, ln. 20-col. 2, ln. 5). However, the cited portion of Hirata does NOT mention converging all the branches of a state machine. Unless the Office Action can point to specific language in Hirata that discloses or teaches “converging all the branches of a state machine, for a given stored pattern, to a single next state when a first number of the characters are matched to the contents of a state field to all state transitions of the branches,” as recited in Applicant’s Claim 20, the Office Action has failed to properly make a prima facie case of obviousness under 35 USC 103.

Claim 21 depends from Claim 20 and therefore distinguishes over the cited references for at least the same reasons as Claim 20.

#### Independent Claim 23

Applicant’s Claim 23 recites, in part:

creating a count that equals a number of the suffix characters plus a number of the wildcard characters.

As discussed above with respect to Claim 1, none of cited references, whether taken alone or in combination, disclose or suggest “creating a count that equals a number of the suffix characters plus a number of the wildcard characters,” and

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1 Ex Parte Catan, 83 USPQ2d. 1569 (BPAI 2007).

therefore Claim 23 is patentable over the cited references.

Claims 25-29 depend from Claim 23 and therefore distinguish over the cited references for at least the same reasons as Claim 23.

#### Independent Claim 45

Applicant's Claim 45 recites:

A string search apparatus, comprising:

control circuitry to receive a text string having a plurality of characters; and  
a pattern and state database including a ternary content addressable memory (TCAM) coupled to an associated memory, wherein the pattern and state database is operable to perform an unanchored search of the plurality of characters with patterns stored in the TCAM and associated memory by comparing a state of the state machine and one of the plurality of characters with contents of a state field and a character field, respectively, within the patterns stored in the TCAM, wherein the contents of the state field and the character field stored in the TCAM embody state transitions of the state machine, wherein the control circuitry comprises:

a first-in-first-out (FIFO) storage element;  
a register coupled to the FIFO storage element and the TCAM; and  
a rollback circuit coupled to the FIFO storage element.

The Office Action concludes that Stanfill discloses a “rollback circuit” at col. 10, lns 55-67.

As noted by the Office Action, Stanfill’s rollback command is used to undo the last operation. More specifically, Stanfill teaches using the rollback command to undo any changes made to the database by the operating software.<sup>2</sup> In contrast, Applicant's Claim 45 discloses a “rollback circuit coupled to the FIFO storage element,” which in turn is part of “control circuitry to receive a text string having a plurality of characters.”

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<sup>2</sup> Stanfill states at col. 10, lines 48-51: The driver program 14 may issue a Rollback command, which will place the system in its state as of the start of the current phase, undoing any changes to files/databases, as described above.

The Office Action's stated reason for combining Stanfill's rollback command with the teachings of Hirata and Gai is to "be able to undo the last operation." However, in a search operation using either the architectures of Hirata or Gai, it would not be desirable to "undo" the last compare operation or to undo the last state transition, as this would unnecessarily slow the search speed. Indeed, the Office Action's proposed combination of Stanfill with Hirata, Gai, Fritchman, and McAuley would not result in the structure recited in Applicant's Claim 45. Accordingly, Claim 45 is patentable over the cited references.

Claims 46 and 49 depend from Claim 45 and therefore distinguish over the applied references for at least the same reasons as Claim 45.

CONCLUSION

In light of the above remarks, it is believed that Claims 1-16, 19-23, 25-29, 45-46, and 49 are allowable, and therefore a Notice of Allowance of Claims 1-16, 19-23, 25-29, 45-46, and 49 is respectfully requested. If the Examiner's next action is other than allowance as requested, the Examiner is requested to call the undersigned at (408) 236-6646.

Respectfully submitted,

A handwritten signature in black ink, appearing to be 'W. L. Paradise III', written over a horizontal line.

August 11, 2008

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